

Appendix 5 – Hazardous Materials Report

The following summarizes the various hazardous materials investigations conducted on the Douglas Point and Maryland Point tracts.

Douglas Point

Polychlorinated Biphenyls (PCBs)

The on-site investigation identified suspect Polychlorinated Biphenyls (PCB) containing material (ESA, Inc. 2001). A visual observation for equipment and components with a potential to contain dielectric fluid, an insulating oil, with concentrations of PCBs in excess of fifty parts per million (50 ppm) was conducted. The following was observed: the Douglas Point property is not currently supplied with overhead electric service from any mounted electrical transformers. One downed overhead electrical transformer attached to the pole was identified on the southern parcel east of Maryland 224. The transformer is dismantled and appears to be dry. No evidence of stained leaves or residue on the soil surface existed. The location of the overhead transformers was identified as upland with no apparent rills or pathways of surface water dissecting the immediate location. [It is recommended all three parts of the transformer be removed, packaged by a certified PCB waste hauler and shipped for disposal to an approval disposal facility

Regulated Asbestos-Containing Materials (RACM)

During the on-site investigation, ESA, Inc., did not observe suspect asbestos containing materials in the form of non-friable rolled siding. No testing of the suspect material was conducted.. All structural improvements identified during the August 29, 2001, on-site walk revealed suspect Category-I; non-friable asbestos materials in the form of rolled asphalt siding on the Douglas Point property. Suspect asbestos-containing materials were not sampled at the time of the assessment. Should demolition of the structure occur, it is recommended demolition should be done according to a designated Operations and Maintenance (O&M) in accordance with federal, State and local guidelines. Non-friable materials have historically been shown neither to be a significant environmental threat nor a lender foreclosure liability.

Lead-Containing Paint

There was no suspect lead-containing paint material observed on the Douglas Point property. The project site has no structural improvements that are suspect to contain lead. All structural improvements identified during the August 29, 2001, on-site walk were degraded beyond the painted surface. During the site assessment, no evidence of lead containing paint or other products were observed. No further action or investigation regarding lead containing hazards on the Douglas Point property is required.

Radon Gas

A search of the Environmental Protection Agency, Region III, Air Protection Division database revealed on average within this area of the county , 0-10 percent of indoor readings as above the recommended 4 picocuries per liter. It is recommended no further action is required with regard to radon on Douglas Point property.

Waste Dumping on Property

Extensive illegal dumping has historically occurred on this site. The majority is concentrated along Maryland 224 on the larger southern parcel and on the perimeter of the two smaller parcels. It is recommended the removal of illegally dumped household trash and debris to a State certified waste facility. Additional action may be necessary to discourage future disposal of debris on-site such as signage and four foot chain link fencing behind the guardrail along Maryland Route 224. Dumping of household trash and debris has historically been shown neither to be a significant environmental threat nor a lender foreclosure liability.

Facility Storage Tanks (Above and Below Ground)

Visual observations for man ways, vent pipe and fill connections did not identify any surface connections which would indicate the existence of an underground storage tank other than in the County leased radio tower area. Review of currently installed mechanical equipment, and historical information concerning mechanical equipment, identified no alternative fuel sources (i.e., electric and natural gas).

Adjacent Properties

The general vicinity of the Douglas Point property consists of forested, low density residential properties, secondary roads, and a few agricultural fields. The southern parcel is bordered to the west by the Potomac River. No further action or investigation is required with regard to potential environmental risks to the Douglas Point property from identified adjacent properties.

Hazardous Materials at Maryland Point Observatory:

Bhate Environmental Associate, Inc (BEA 1998), performed PHASE I-ESA on February 3, 1998 on this property; the findings are listed below:

Aboveground Storage Tanks (ASTs)

During BEA site=s visit, seven (7) ASTs were observed at the site; six (6) 275 gallon capacity and one (1) 1,000 gallon capacity. These ASTs were not in use and believed to

be empty. Based on the available information the 275-gallon capacity tanks were used for the storage of heating oil and the 1,000 gallon capacity AST was used for the storage of diesel fuel for emergencies generator. No oil stains or stressed vegetation in immediate vicinity were observed. It is recommended that State laws and regulations should decommission all these ASTs.

Asbestos Containing Materials (ACM)

The subject site consists of nine (9) buildings all constructed between 1956 and 1961. Due to the age of these buildings, there is a potential of ACM may be found in the buildings. Hygienetics Inc., performed an Asbestos Survey and Hazard Assessment of these buildings during November 1989. Buildings # 1, 3, 7, 8, 13, control building for 84-foot antenna and Office Trailer have 9"x 9" floor tiles which contain red vinyl asbestos were found throughout these buildings. Mastics/adhesives were found under these tiles tested positive for asbestos. All buildings if not required for use should be removed.

Polychlorinated Biphenyls (PCBs)

Four (4) pole-mounted transformers were observed at the subject site. No obvious leaking or staining was noted in association with these transformers. Presently, the Southern Maryland Electric Cooperative (SMECO) owns, operates, and maintains these transformers. On May 13, 2002, a letter received from SMECO, indicated these transformers should be considered as PCB containing materials until the oil from each unit is sampled and tested. SMECO is responsible for spills at the subject site and should be notified White Plains District in case of spills or staining at 1-888-440-3311 and/or 301-645-3636.

Lead Based Paint

The subject site consists of nine (9) buildings all constructed between 1956 and 1961. Due to the age of these structures, there is a potential that painted surfaces consisting of lead based paint may be found in the buildings. A lead based paint investigations may be conducted in order to identify and locate lead based surfaces.

Adjacent Properties

From 1956 until approximately 1971, about 200 acres of land surrounding the subject property was leased by the Naval Research Laboratory to provide a buffer zone for the Maryland Point Observatory. Currently that area consists of wooded land. As early as 1930, the subject area was part of a cherry farm and in the recent past used to harvest timber. There were no readily apparent indications of uses of any of the adjoining properties for manufacturing or industrial purposes.

Structures

The site contains seven structures such as a frame hoist, 84-foot antenna base, generator fuel tank, antenna control house, office, antenna pedestal and apron, and staging apron/84; antenna/C. If not needed these structure should be removed from the site. The facility includes two fully steerable parabolic telescope antennas, 84-feet and 85-feet in size. If not needed these should be removed from the site.

PCBs

As result of CASHE audit by Aarcher, Inc. additional information follows for Maryland Point:

Fluorescent light fixtures are located in several buildings. Due to the age of the structures the light ballasts probably contain PCBs. EPA regulations require all ballasts and capacitors manufactured after 1979 to be marked "NO PCB". Therefore, if ballasts is not labeled "NO PCB", it should be assumed to contain PCBs. A small-disconnected GE transformer is stored on the floor of building 13, an ESCO transformer in building 8 appears to be oil-filled. The right side of the transformer has a drain plug in it. The floor on the right side of has oil spilled on it. PCBs are known carcinogens and are regulated as a hazardous waste in Maryland (Aarcher, Inc., 2002)

Abandoned Buildings

The building have numerous deficiencies. The roof to one structure is leaking and falling in. Another building's floor is collapsing. Most of the buildings have openings and damage to the walls and are infested with mice.

Abandoned Air Conditioners

Over time, when stored outdoors, the rubber seals on a refrigerator will dry and the Freon or CFC will leak out. The refrigerants must be recovered as soon as appliance or device containing CFC misplaced on long-term storage or is no longer needed. Venting Freon into the environment has been prohibited since June 14, 1993. The regulations also especially prohibit the disposal of nay appliance if it is known to contain CFCs. Therefore, the air conditioners at the site must be removed and their Freon recovered prior to demolition of any structure with its own air conditioning unit. The local landfill may have a certified CFC recovery.

Electric Power Hazards

Electric Power is still provided to at least one of the radio telescopes and most of the buildings. Exposed and energized wiring was found in several structures. This exposed wiring poses an electrocution hazard

Wilson Farm

No Phase I environmental site assessment regarding the presence of toxic and hazardous materials is available at this time. No known toxic or hazardous substances are known to exist on the property.

Purse State Park

No Phase I environmental site assessment regarding the presence of toxic and hazardous materials is available at this time. No known toxic or hazardous substances are known to exist on the property.

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Appendix 6 – Soil Associations

This appendix discusses the soils specific to the State and Federal tracts and generally throughout the planning area.

Table 8. Characteristics of Soils in Planning Area.

Soil Series	Soil Types Include ^{1/}	Characteristics
BELTSVILLE SERIES	Beltsville Silt Loam Bibb Silt Loam	most extensive soils in the county
		nearly level to moderately sloping deep and well drained
		strongly acidic and slowly permeable, and have a fragipan at a depth generally less than 30"
		formed in recently deposited alluvium
		easy to work
		moderately permeable
Elkton Series	Elkton Silt Loam	nearly level, poorly drained
		contain fine subsoil; slowly to very slowly permeable
		formed in old deposits of very clayey marine and alluvial sediments
		high water table; wet for long periods
		Poor drainage and high water table severely limit most non-farm lands
Exum Series	Exum Silt Loam Exum Clay Loam Exum-Beltsville Loam	gently sloping to moderately sloping deep, moderately well drained upland soils
		formed in old silty deposits containing moderate amounts of clay and small amounts of sand
		high available moisture capacity, but are low in natural content of plant nutrients
		Wetness, slope, and erosion chiefly limit use of these soils
Luka Series	Luka Silt Loam	nearly level to gently sloping, deep, moderately well-drained soil on floodplains and in upland depressions
		formed in recently deposited alluvium washed mainly from uplands
		easy to work at favorable moisture content
		permeability moderate to moderately slow
		high water table late in spring, high available moisture capacity
		suited to cultivated crops, pasture, and woodland
Keyport Series	Keyport Silt Loam	moderately well drained nearly level to moderately sloping chiefly at low elevations near major rivers
		high available moisture capacity and low permeability
		not well suited to deep-rooted crops that require good drainage and soil aeration
Leonardtown Series	Leonardtown Silt Loam	shallow or moderately deep, poorly drained, nearly level soils that have a fragipan
		formed in old silty marine deposits
Mattappex Series		level to moderately sloping, deep, moderately, well drained soils
		chiefly in low-lying areas bordering major rivers
		easy to work, limited by the presence of high water table in winter and spring

Soil Series	Soil Types Include ^{1/}	Characteristics
		moderately low permeability
		intensively farmed seasonal wetness and impeded drainage limit non-farm uses
Sassafras Series	Sassafras Sandy Loam	nearly level to moderately sloping, deep, well drained soils on uplands
		formed in loose deposits of loamy and sandy sediment of marine and alluvial origin
		easy to work
		moderate available moisture capacity and are moderately permeable
		slope and erosion hazards limit farming and non-farm uses
Tidal Marsh		soil material ranges from sand to clay; with some places it is peaty and mucky
Wickham Series	Wickham Fine Sandy Loam	gently sloping to moderately sloping, deep, well drained soils on ancient terraces of the Potomac River
		formed in old loamy deposits containing mica, other weatherable minerals and small amounts of silt
		high available moisture capacity and are moderately permeable

Notes:

^{1/} Refer to text for details.

Soils On State and Federally-Owned Parcels in Planning Area

Wilson Farm

Most of Wilson Farm contains Exum series soils. Also found near the entrance road is Beltsville Silt Loam (BIB2) that is subject to moderate erosion. KpA is found near the river and Tidal Marsh (Tm) soils are found surrounding in main drainage areas. Other areas of the property include Gravelly Land (GvE), and Eroded Land (ErE), which can be highly erodible and have steep slopes.

Douglas Point

Twenty-four soil types have been identified for the Douglas Point tract (USDA 1974). The soil types include the Beltsville-Exum-Wickham (BEW) association and the Evesboro-Keyport-Elkton (EKE) association. These soils are level to moderate in slope and run the gamut from poorly drained loams to excessively drained sandy soils depending on location in the landscape. Problem areas may include erodible soils on steep slopes, wet soils in drainage ravines and wetlands, and very dry soils that prevent root growth, as well as erosion of the shoreline bluffs. As the majority of the property is currently forested, erodible soils may be destabilized if the land is disturbed or cleared.

Purse State Park

The park's coast is mostly comprised of nearly level Keyport Silt Loam (KpA). The steeper Gravelly Land (GvE) encompasses most of the tract's drainage area, and the upland is composed of mostly Exum series soils subject to erosion.

Maryland Point Naval Observatory

The only soil type present at Maryland Point tract is Keyport Silt Loam (KpA), which causes the relatively flat and level nature of the land.

Remainder of Planning Area

A review of the Soil Survey of Charles County, Maryland (USDA, 1974) indicates the site has twenty-four identified types of soil falling within the Beltsville-Exum-Wickham (BEW) association and the Evesboro-Keyport-Elkton (EKE) association. The BEW association is said to contain level to moderately sloping, moderately well drained and well-drained loamy soils. Some of these soils contain moderately deep to hard, dense, root-inhibiting fragipan. The EKE association is said to contain level to moderately sloping excessively drained, sandy soils and moderately well drained and poorly drained, level to gently sloping, loamy soils that have a clayey subsoil. Aerial overlay (1970) from soils maps shows the project site consisted of mixed coniferous and deciduous forest. A detailed description of the soils that occur in the subject area follows:

Soil Series Detail

Beltsville Series:

The Beltsville series consists of nearly level to moderate sloping, moderately deep, moderately well drained soils. These soils are strongly acid and slowly permeable, and have a fragipan that generally is at a depth of less than 30 inches. Beltsville soils are formed in silty and moderately sandy material containing moderate amounts of clay. They are in the most upland areas and are the most extensive soils in the county. Near the surface these soils are often saturated, but they are almost dry in and below the slowly permeable fragipan. This Beltsville series include the following type of soils:

- a) Beltsville Silt Loam (BIA); 0 to 2 percent The hazard of further erosion generally is slight.
- b) Beltsville Silt Loam (BIB2); 2-5 percent slopes, moderately eroded.
- c) Beltsville Silt Loam (BIC2); 5 to 10 percent slope, moderately eroded.
- d) Beltsville Silt Loam (BIC3); 5 to 10 percent slopes, severely eroded.

Bibb Silt Loam (Bo) B This is the only Bibb soil mapped in the county. It is nearly level and in only a few places are slopes more than one percent. These formed in recently deposited alluvium that was washed mainly from soils on the uplands Bibb soils are easy to work when the moisture content is favorable. The native vegetation is wetland hardwoods, mainly red maple, blackgum, birch, willow, and oaks. Artificial drainage is needed for cultivated crops. The high water table may cause delays in planting where Bibb soils are farmed. These soils are moderately permeable.

Elkton Series:

The Elkton series consists of nearly level, poorly drained soils in areas bordering major rivers on higher upland flats. These soils have fine subsoil that is slowly permeable to very slowly permeable. These formed in old deposits of very clayey marine and alluvial sediments. These soils have high available moisture capacity. These have high water table, and are wet for long periods. Poor drainage and high water table are severe limitations for most nonfarm lands. The soil type is Elkton Silt Loam (Ek).

Eroded Land (ErE):

It consists of steep areas that have been so severely eroded that the soil profile largely has been destroyed. Slopes range from 15 to more than 40 percent. In most places the surface layer and the subsoil have been lost, have been severely gullied or both. This unit is not suitable for crops or grazing. Keeping the areas of this land under a cover of protection vegetation helps to control erosion.

Exum Series:

The Exum series consists of gently sloping to moderately sloping deep, moderately well drained soils on uplands. These lands formed in old silty deposits containing moderate amounts of clay and small amounts of sand. These soils have a high available moisture capacity, but are low in natural content of plant nutrients. The native vegetation mostly is mixed hardwood and Virginia pine. Wetness, slope, and the hazard of erosion chiefly limit use of these soils. The soil types are:

- a) Exum Silt Loam (ExC2); 5 to 10 percent slopes, moderately eroded
- b) Exum Silt Loam (ExD2); 10 to 15 percent slopes, moderately eroded
- c) Exum Clay Loam (ExC3); 5 to 10 percent slopes, severely eroded.
- d) Exum Clay Loam (EyD3); 10 to 15 percent slopes, severely eroded.
- e) Exum-Beltsville Loam (EzB2); 2 to 5 percent slopes, moderately eroded

Gravelly Land (GvE):

Gravelly land, steep, consists of gravelly deposits of soil materials. Most of the gravel is quartz pebbles that are smooth, rounded to subangular, and mostly less than two inches in diameter. Slopes range from about 15 to 50 percent. Gravelly land is not suitable for crops or grazing. It is best suited to woodland, watershed protection, wildlife habitat, and a source of gravel.

Luka Series:

The Luka series consists of nearly level to gently sloping, deep, moderately well drained soil on flood plains and in uplands depressions. These soils formed in recently deposited alluvium that was washed mainly from soils on the uplands in the county. Where these soils occur on flood plains, these are subject to flooding from streams. Where these occur in upland depressions, these are saturated with water for short periods. Luka soils are easy to work at favorable moisture content. These have a high water table late in spring, high available moisture capacity. Permeability in these soils is moderate to moderately slow. The native vegetation consists of mixed wetland hardwoods. The soil type includes

- a) Luka Silt Loam, local alluvium (ln) B The soil is seasonally wet and seepage spots are common. It does not dry as quickly and is not easy to work. This type soil is suited to cultivated crops, pasture, and woodland.

Keyport Series:

The Keyport series consists of moderately well drained nearly level to moderately sloping soils. These soils are chiefly at low elevations near major rivers. Keyport soils have high available moisture capacity and permeability is low. These soils are limited by impeded drainage, slow movement of water, through the subsoil, and the hazard of further erosion. These are not well suited to deep-rooted crops that require good drainage and soil aeration. The native vegetation is mixed and wetland hardwoods. These types of soils are:

- a) Keyport Silt Loam (KpA); 0 to 2 percent slopes
- b) Keyport Silt Loam (KpC2); 5 to 12 percent slopes, moderately eroded.
- c) Keyport Silt Loam (KpC2); 5-12 percent slopes, moderately eroded.

Leonardtown Series:

The Leonardtown series consists of shallow or moderately deep, poorly drained, nearly level soils that have a fragipan. These soils are on upland flats that commonly lack channeled drainage ways. They formed in old silty marine deposits. The native vegetation consists of wetland hardwoods, including oaks, holly, maples and gums. This include the soil type:

- a) Leonardtown Silt Loam (Le)

Mattappex Series:

The Mattappex series consists of level to moderately sloping, deep, moderately, well drained soils. These soils are chiefly in low-lying areas bordering major rivers of the county. Mattappex soils are easy to work, but in winter and in spring they are limited by the presence of high water table. Available moisture capacity is high. Permeability is moderately is low. These soils are intensively farmed. Seasonal wetness and impeded drainage are limitations for nonfarm uses. The native vegetation is mixed wetland hardwoods.

Sassafras Series:

The Sassafras series consists of nearly level to moderately sloping, deep, well-drained soils on uplands. These soils formed in loose deposits of loamy and sandy sediment of marine and alluvial origin. The soils are easy to work. These have moderate available moisture capacity and are moderately permeable. Slope and the hazard of further erosion are the chief limitations to farming and non-farm uses. The native vegetation is mixed hardwood, mainly oaks. The soil type is:

- a) Sassafras Sandy Loam (ShA); 0-2 percent slopes.

Tidal Marsh (Tm):

Tidal marsh is in estuaries along the lower sides of streams and in low areas that border the major rivers. Some areas are flooded daily by tidal waters and others are flooded less frequently. Tidal waters vary in salinity from almost fresh to strongly brackish. The soil material ranges from sand to clay, but some places it is peaty and mucky. The vegetation is marsh grasses and sedges that contain some salt-tolerant herbs and low shrubs. Tidal marsh is not suited to crops, pasture, or trees. It is suitable for use as habitat for wetland wildlife, tidal pool, and for recreation.

Wickham Series:

The Wickham series consists of gently sloping to moderately sloping, deep, well-drained soils on ancient terraces of the Potomac River. These soils formed in old loamy deposits that contain mica, and other weatherable minerals and a small amount of silt. Wickham soils are easy to work except in places where they are severely eroded. These have high available moisture capacity and are moderately permeable. Slope and the hazard of further erosion are chief limitations to use. The native vegetation is mixed upland hardwoods and Virginia pine. The soil type includes:

- a) Wickham Fine Sandy Loam (WkC2); 2 to 5 percent slopes, moderately eroded.

Appendix 7 – Biological Species

Plant Species at Douglas Point by Habitat Type

The following indicator flora species are found on the Douglas Point tract (Charles County 1980):

Table 9. Tree and plant species at Douglas Point

Mixed hardwood forest species			
White oak (<i>Quercus alba</i>)	Southern red oak (<i>Q. falcata</i>)	Chestnut oak (<i>Q. prinus</i>)	Scarlet oak (<i>Q. coccinea</i>)
Mockernut hickory (<i>Carya tomentosa</i>)	Pignut hickory (<i>C. glabra</i>)	Beech (<i>Fagus grandifolia</i>)	Yellow poplar (<i>Liriodendron tulipifera</i>)
Flowering dogwood (<i>Cornus florida</i>)	American holly (<i>Ilex opaca</i>)	Mountain laurel (<i>Kalmia latifolia</i>)	
Pine forest			
Virginia scrub pine (<i>Pinus virginiana</i>)	Japanese honeysuckle (<i>Lonicera japonica</i>)	Red maple (<i>Acer rubrum</i>)	Sweet gum (<i>Liquidambar styraciflua</i>)
Black gum (<i>Nyssa sylvatica</i>)	false indigo (<i>Amorphia fruticosa</i>)	black locust (<i>Robinia pseudoacacia</i>)	
Wetland species (including freshwater marsh, shrub swamp and tree swamp communities)			
<i>Freshwater marsh (and sand bars of these wetlands)</i>			
Dock (<i>Rumex sp.</i>)	Knotweed (<i>Polygonum spp.</i>)	Rose mallow (<i>Hibiscus moscheutos</i>)	Broad-leaved cattail (<i>Typha latiflora</i>)
Narrow-leaved cattail (<i>T. angustifolia</i>)	Wax myrtle (<i>Myrica cerifera</i>)	Box elder (<i>Acer negundo</i>)	Red willow (<i>Cornus amomum</i>)
<i>Shrub swamp</i>			
false indigo (<i>Amorphia fruticosa</i>)	Swamp rose (<i>Rosa palustris</i>)	Common alder (<i>Alnus serrulta</i>)	Black willow <i>Salix nigra</i>)
<i>Tree Swamp</i>			
Pumpkin ash (<i>Fraxinus tomentosa</i>)	Green ash (<i>F. pennsylvanica</i>)	White ash (<i>F. americana</i>)	Red maple (<i>Acer rubrum</i>)
Open field species			
Tickseed sunflower (<i>Bidens polylepsis</i>)	Sticktight (<i>Desdemonium spp.</i>)	Goldenrod (<i>Solidago spp.</i>)	Thoroughwort (<i>Eupatorium spp.</i>)
Aster (<i>Aster spp.</i>)	Dewberry (<i>Rubus flagellaris</i>)	Black-eyed susan (<i>Rudbeckia hirta</i>)	

Vegetation - Upland Communities

Douglas Point

A mixed hardwood forest is the dominant vegetation on the Douglas Point Tract. This forest type is very indicative of western Charles County and the soils that are present. Ravines and adjacent uplands in the central and southern portion of the parcel support a mature hardwood forest that is beginning to exhibit the characteristics of: uneven age, well-developed vertical structure with large trees apparently over 100 years old, canopy gaps, and large amounts of woody debris on the forest floor. White oak, Northern red oak, Southern red oak, Swamp chestnut oak, Bitternut and Mockernut hickories, Tulip tree (yellow poplar), and Beech are common in the overstory. American holly, Mountain laurel, and Paw paw are common in the understory. Other species include Birch, Sweet gum, Willow oak, Maple, Cherry, Cedar, Dogwood, Spice bush, and Greenbrier. The gypsy moth has defoliated and killed trees on the property and oak decline is present. Oak regeneration is sparse due to the dense understory of Laurel and Holly.

Virginia pine is the dominant tree comprising the pine forest community, which also includes loblolly pine, red maple, sweet gum and black gum. Understory vegetation includes black locust, false indigo, and Japanese honeysuckle. Currently there are also several stands of Virginia pine in decline on the property, evident by the abundance of trees blown down. This is typical of the species, as it ages resulting in frequent blocked access roads and gaps in the canopy.

An old-field community is located in the southern portion of the Douglas Point property. Vegetation includes grasses, Goldenrod, Asters, Dewberry and Virginia pine.

Maryland Point

The majority of the property is open field. A study of remaining tree stands and of successional growth since the installation was closed remains to be completed.

Wilson Farm

Wilson Farm displays many of the same communities as found at Douglas Point and the remainder of the study area. Having once been in agricultural use, there are several old-field communities with many of the early successional species, such as Eastern red Cedar, Black locust, and Ailanthus, as well as grasses.

The forested ravines to the north and south of the entrance drive are mature and in excellent condition, and provide suitable habitat for several rare species currently and historically known to occur in the general vicinity. The ravine south of the entrance drive supports several herbaceous species that are characteristic of the Piedmont region and uncommon on the Coastal Plain, including Showy orchis (*Galearis spectabilis*), Broad beech fern (*Dryopteris hexagonoptera*), and Maidenhair fern (*Adiantum pedatum*). These species, with an overstory including White ash (*Fraxinus americana*) and Tulip tree (*Liriodendron tulipifera*), indicate that the ravine cuts through a geologic formation containing shell deposits that contribute calcium to the soil. North of the entrance road

the mature forest does not reflect the same influence of shell deposits, but appears to be more acidic. Both ravines are steeply sloped and have very fragile, erodible soils.

Stands of pines transitioning into mixed pine and hardwood can be found on the western portion of the property south of the old fields. The eastern portion of the property contains mixed hardwood and pine similar in species to the remainder of the study area.

Purse State Park

The upland communities at Purse State Park are similar to those found on the Douglas Point Tract since the properties are contiguous. The western portion of the property is dominated by pine and mixed hardwoods, transitioning to maturing hardwood forest towards the river. Again, Holly and Paw paw are dominant understory trees. Small clearings on the property exhibit vegetation indicative of disturbance and proximity to the shoreline, such as red cedar and black Locust as well as typical edge species. The eastern portion of the property is also dominated by maturing hardwoods. Holly is the dominant understory tree and mountain laurel populates a large area on the slope of a drainage ravine.

Vegetation – Wetlands Communities

Douglas Point Properties and the Study Area

Wetland communities in the study area include freshwater marshes and forested wetlands associated with seeps and drainages, lakes and ponds, and tidal wetlands, which are influenced by freshwater and saltwater. The freshwater wetlands are characterized by emergent plants such as cattails, pickerel weed, rushes and sedges. The common tree and plant species found in the forested wetlands within the study area include pumpkin ash, green ash, red maple, false indigo, swamp rose, common alder, and black willow.

Douglas Point

Most of the wetland systems on the western side of this tract are associated with the forested flood plains of the two perennial streams, the various drainage areas, and three intermittent streams. Other open wetlands are associated with the riverine influence of the Potomac River and bounded by steep slopes. In several locations groundwater seeps to the surface and creates nontidal wetlands with soil that is saturated year round but seldom, if ever, floods. The seeps have a partially open canopy, with Sweet bay dominant in the understory and a diverse shrub layer including Possum-haw, Winterberry, Spicebush, Fringe tree, Poison sumac, and Red-berried greenbrier. The herbaceous layer is also diverse, with Cinnamon fern and several other ferns, species of sphagnum moss and liverworts, several species of sedge and skunk cabbage. The eastern side, in contrast, has one drainage area with limited associated wetlands.

Maryland Point Naval Observatory

Further study of the property should be performed to locate any locally wet or poorly drained areas. The relatively flat topography and the loamy soils would indicate that the property is not prone to significant drainage or wetland systems. The entrance road runs through an obvious, large nontidal wetland.

Wilson Farm

The most prevalent wetland system on Wilson Farm is associated with Mallows Bay. The various streams that feed into the bay have an extensive area of tidally influenced wetlands that act as a transition to the inlet bay itself. These wetlands receive the drainage from the steep slopes surrounding them. Other wetlands on the property are associated with the flood plains of two streams that cross under MD Route 224. In addition, an open water beaver pond lies on the southern boarder of the property.

Purse State Park

Wetlands on the park property appear to be less prevalent in the landscape than as on the Wilson Farm and Douglas Point tracts. Wetlands associated with the drainage areas and where the few tributary streams feed into the river are the only systems of note on the property.

Forestry

Table 10. Forest Stand Summary at Douglas Point

Stand #	Forest Type	Timber Size	Acres	% total forest cover
1	RO,WO, CO,YP	Sawtimber/Mature	784.6	57 %
2	CO	Sawtimber/Mature	26.2	2 %
3	CO, RO	Sawtimber/Mature	90.8	6%
4	YP, SG	Sawtimber/Pole	21.4	1 %
5	VP, LP	Sawtimber/Pole	135.3	10 %
6	YP, SG	Sawtimber/Mature	59.2	4 %
7	RM, SG, WIO	Sawtimber	25.7	2 %
8	WO, RO, AB	Pole/Sawtimber	121.2	9 %
9	AB,WO	Pole/Sawtimber	63.5	5 %
10	RM,AB	Pole/Sawtimber	14.8	1 %
11	Old Field/VP	Sapling/Pole	18.4	1 %
	Wetlands		24.8	2 2 %
	Total		1386.1	100 %

Notes: AB – American Beech, CO – Chestnut Oak, LP – Loblolly Pine, RO – Red Oak, RM – Red Maple, SG – Sweet gum, VP – Virginia Pine, WIO – Willow Oak, WO – White Oak, YP – Yellow Polar.

Invasive Species

Douglas Point

Below the 50-foot topographic contour, the areas that support the most mature deciduous forest are virtually free of invasive species, while Japanese honeysuckle is abundant in younger deciduous stands. Japanese stilt grass is present along the road to the transmitter, and is just beginning to spread into the upper ends of a few intermittent streams near the road. In some areas of the younger mesic deciduous forest north of the transmitter access road, Japanese honeysuckle vines are twining on shrubs and tree saplings, inhibiting their growth.

In the large beaver marsh that flows into the Potomac River at Douglas Point north of the transmitter access road, phragmites forms a dense stand in the center of the marsh, but currently constitutes a small portion of the marsh area. Individual plants are scattered at the upstream end of the marsh where it transitions to shrub swamp. Phragmites has also established in small, isolated nontidal seepage wetlands northeast of this beaver marsh.

East of MD Route 224, invasive species are established in the vicinity of the abandoned houses.

Maryland Point Naval Observatory

No assessment has been made regarding invasive species on this property, although it is likely that some may be present due to the past history of human activity and ingress and egress of vehicles on this property.

Wilson Farm

The forested ravines to the north and south of the main entrance drive have few invasive species. Japanese honeysuckle is scattered in low density and is not likely to become aggressively invasive as long as canopy cover is maintained. However, if trees are removed from this mature forest, the additional sunlight will promote the growth of this species to the detriment of the native species in the vicinity.

In the young upland forest along the entrance road and in the power line right-of-way, several non-native, invasive species are well established and locally dominant. Japanese honeysuckle forms a thick groundcover in some areas and is twining around tree saplings, inhibiting their growth. Japanese stilt grass is abundant in the right-of-way, and tree of heaven is scattered adjacent to the right-of-way.

Along the beaver pond south of the entrance drive, several non-native, invasive species grow along the wetland edge and lower slope, including Japanese stilt grass, wineberry, and marsh dewflower.

Purse State Park

Chinese lespedeza has been observed in a clearing located near the end of the dirt road that accesses Purse State Park (McKnight pers. comm. 2001). No other assessment has been made regarding invasive species on this property.

Wildlife

Aquatic Species

Table 11. Finfish species collected in order of least to most abundant at two Potomac River beach seine sites

Site Name	Blossom Point	Liverpool Point
Common Name	Banded blenny	Atlantic croaker
	Chain pickerel	Blue catfish
	Longnose gar	Longnose gar
	Quillback	Rainwater killifish
	Redear sunfish	Redbreast sunfish
	Sheepshead minnow	Smallmouth bass
	Spanish mackerel	Spanish mackerel
	Threadfin shad	Striped killifish
	Winter flounder	Striped mullet
	Hogchoker	Summer flounder
	Oyster toadfish	Threadfin shad
	Atlantic thread herring	Unknown cyprinid
	Striped mullet	White catfish
	Brown bullhead	Black crappie
	American eel	Crevalle jack
	Fourspine stickleback	Quillback
	Channel catfish	Satinfin shiner
	Tessellated darter	Goldfish
	White catfish	Striped anchovy
	Northern pipefish	Chain pickerel
	Silver perch	American eel
	Largemouth bass	Brown bullhead
	Bluegill	Silver perch
	Carp	Atlantic needlefish
	Golden shiner	Mummichog
	Striped anchovy	Unknown sunfish
	Spottail shiner	Carp
	Atlantic croaker	Channel catfish
	Yellow perch	Bluefish
	American shad	Tessellated darter
	Bluefish	Spot
	Atlantic needlefish	Largemouth bass

Site Name	Blossom Point	Liverpool Point
	Pumpkinseed	Yellow perch
	Alewife	Banded killifish
	Gizzard shad	Pumpkinseed
	Rough silverside	Golden shiner
	Banded killifish	Bluegill
	Striped killifish	Gizzard shad
	Mummichog	Bay anchovy
	Inland silverside	Rough silverside
	Silvery minnow	Spottail shiner
	Spot	American shad
	Blueback herring	Striped bass
	Striped bass	Silvery minnow
	Bay anchovy	Alewife
	White perch	Inland silverside
	Atlantic silverside	Atlantic silverside
	Atlantic menhaden	Blueback herring
		Atlantic menhaden
		White perch

Note: Other aquatic resource data are available through the Maryland DNR Watershed Assessment Division.

